



P B C - 1

PRO BOOST CONTROLLER

OPERATING INSTRUCTION MANUAL

READ ENTIRE MANUAL BEFORE INSTALLATION



Product Name: PBC-1
Product Part Number: WE-9000.9016
Manual Part Number: WE-6009.0004
Manual Version Number: 1.0

Only use this product for the intended purposes listed in this manual. WORLD electronics is not responsible for any harm or accidents caused by any improper use of this product. **Installation of this product should only be performed by an experienced installer.** Installation requires many skills, please refer installation to a qualified, experienced installer.

PBC SAFETY PRECAUTIONS:

! Please read the following safety precautions carefully or severe injury or DEATH can result.

! Please keep this manual in a readily accessible location for future reference.






SAFETY PRECAUTION SYMBOL EXPLANATION:

! The following safety precaution symbols are displayed throughout this manual to represent the following precautions and possible outcome if the precaution is not obeyed.

 **DANGER** Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **CAUTION** Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

GENERAL SAFETY PRECAUTIONS:

-  **DANGER**** • **Do not install this unit in any way that will affect normal driving visibility or operation of the vehicle.** Failure to do so can result in DEATH or serious injury from a traffic accident.
-  **DANGER**** • **Do not operate the unit while driving except when learning gears (this must be done in a vacant parking lot or outdoor track).** Failure to do so can result in DEATH or injury from a traffic accident.
-  **DANGER**** • **Connect all wiring exactly as shown in the manual.** Failure to do so can result in damage to the unit, the vehicle, or result in DEATH or serious injury to the user.
-  **DANGER**** • **Connect all the engine compartment components (pressure transducer and solenoid manifold) exactly as shown in the manual.** Failure to do so can cause damage to the unit, the vehicle, or result in DEATH or injury.
-  **DANGER**** • **Never disassemble, modify, or tamper with this product or any of its components.** Any modifications or tampering will result in voiding the warranty and can result in damage to the unit, the vehicle or result in DEATH or serious injury to the user.

GENERAL SAFETY PRECAUTIONS (CONT.):

- **⚠ CAUTION** • **This unit is intended for use in a vehicle with a 12VDC operating voltage and a negative ground system.** Connection to any 24VDC or positive ground vehicle can result in damage to the unit or the vehicle.
- **⚠ CAUTION** • **Be sure to disconnect the negative terminal of the battery before proceeding with the installation.** Failure to do so can result in vehicle fire, electrical shortage, vehicle or unit damage.
- **⚠ CAUTION** • **Do not expose unit to water.** Water can cause damage to the unit or vehicle.
- **⚠ CAUTION** • **Mount all PBC engine compartment components (pressure transducer and solenoid) away from excessive heat.** Failure to do so can cause damage to the components and render the unit inoperative.
- **⚠ CAUTION** • **Route all wiring away from excessive heat.** Failure to do so can cause the wire to melt rendering the unit inoperative.
- **⚠ CAUTION** • **Do not expose this unit to direct sunlight or excessive heat.** Excessive heat can result in damage to the unit or to the vehicle.
- **⚠ CAUTION** • **Do not drop this unit or expose it to excessive shock.** Excessive shock can result in damage to the unit or to the vehicle.

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PBC-1 DESCRIPTION OF OPERATION:

Thank you for purchasing the WORLD electronics (PBC-1) Pro Boost Controller. **Please read this entire manual prior to installation.** The following is a brief description of the unit's operation.

The PBC-1 Pro Boost Controller operates a vehicle's existing or after-market wastegate valve that controls the vehicle's turbo compressor. The turbo forces air into the intake of the vehicle engine creating a pressure (boost). The turbo is directly driven by the engine's exhaust. The wastegate controls the turbo compressor by re-directing the exhaust away from the turbo, allowing the turbo compressor to slow, decreasing boost pressure created at the intake manifold.

The PBC-1 controls the turbo wastegate by sensing the amount of pressure (boost) at the intake manifold and pulse width modulating a single solenoid according to the user preset boost limit value. This "pulsing" valve opens and closes the wastegate to produce a stable pressure (boost) at the intake manifold.



TUNING HINT: Aftermarket wastegate spring rates will determine boost control range. You must choose the correct spring rate for your application so that it fits within the range of the PBC-1.



PBC-1 FEATURES:

- Proportionally controls intake manifold pressure (boost) up to 50 psi.
- Controls boost in one of six methods:
 1. **PSI 1 single setting**
 2. **PSI 2 push button activated scramble / 2nd stage boost**
 3. **PSI 3 push button activated scramble / 3rd stage boost**
 4. **PSI 4 push button activated scramble / 4th stage boost**
 5. **PSI 5 push button activated scramble / 5th stage boost**
 6. **PSI 6 push button activated scramble / 6th stage boost**
- A data recorder feature allows the user to view boost and time recorded for 20 seconds.
- Pressure transducer with temperature compensation and 1/10 psi accuracy.

⚠ CAUTION

- **Do not use this product for any other purpose than its original intent.**
- **This unit does not come equipped with air-fuel control. Some vehicles may require an air-fuel control device to possibly enrich fuel when high boost pressures are present.**
- **Please read all the instructions carefully before installing or operating this product!**
- **Failure to abide by these procedures may cause a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

⚠ CAUTION



GETTING STARTED:

1. Carefully review all instructions before installing and operating this unit!
2. Make sure all components and hardware are included with this kit before beginning installation
3. After installing the unit in your vehicle, please read the following instructions on operating the Pro Boost Controller.

PBC-1 UNIT OPERATION:



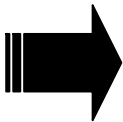
FIRST TIME INITIALIZATION:

The spring pressure of the wastegate will have to be learned before the PBC-1 can accurately control boost (See **Learn Spring Pressure on page 11**). This will only have to be performed once.



RUN SCREEN:

When power is applied to the unit it goes through a brief introduction and then goes directly to the RUN screen. Shown on the top line of the LCD display, from left to right, are the measured boost, the PSI mode, one to six, and the target boost. The bottom row reveals the function of three of the four pushbutton switches: RST signifying reset to stage 1, REC signifying record, and MEN signifying menu. Depressing the switch directly below the displayed function will cause the functions to activate.



The solenoid can only be controlled while the RUN screen is displayed. The solenoid is off when any other screen is displayed. The measured boost is continually updated while in the RUN screen.



MENU SCREEN:

The Menu screen allows the user to step through all of the variable adjustments of the PBC-1. They are:

1. Allows the user to alter the target boost of the current mode (1 to 6).
2. Allows the user to alter the RAMP variable of the current mode.
3. Allows the user to alter the DUTY cycle of the solenoid of the current mode.
4. Allows the user to alter the GAIN of the current mode.
5. Allows the user to view any and all recorded data.
6. Allows the user to view the spring pressure.
7. Allows the user to restore the default variables.
8. Allows the user to toggle the LCD backlight setting.
9. Allows the user to select the Number of stage / modes, from one to six.

When in the Menu screen the top line of the LCD display will reveal the variable to be altered along with its current setting. The bottom line of the display reveals the function of the four pushbutton switches.



The PBC-1 LCD screens are shown in their entirety on the next page.

Run Screen
 X.X PSI(1) 10.0
 RST REC MEN

via REC switch
 X.X PSI(1) 10.0
 RST *REC MEN

via MEN switch
 PSI(1) = X.X
 NXT SEL PRV EXIT

via SEL switch
 PSI(1) = X.X
 NEXT - + EXIT

NXT Variables
 PSI1 to PSI6
 RAMP1 to RAMP6
 DUTY1 to DUTY6
 GAIN1 to GAIN6
 VIEW
 SPRING
 DEFAULTS
 BACKLIGHT
 # OF STAGES
 RESET STAGES

Menu Screen
 PSI(1) = X.X
 NXT SEL PRV EXIT

via NXT switch
 RAMP(1) = +XX
 NXT SEL PRV EXIT

via SEL switch
 RAMP(1) = +XX
 NEXT - + EXIT

via NXT switch
 DUTY(1) = +XX%
 NXT SEL PRV EXIT

via SEL switch
 DUTY(1) = +XX%
 NEXT - + EXIT

via NXT switch
 GAIN(1) = +XX
 NXT SEL PRV EXIT

via SEL switch
 GAIN(1) = +XX
 NEXT - + EXIT

via NXT switch
 VIEW
 NXT SEL PRV EXIT

via SEL switch, VIEW
 X.X PSI X.X SEC
 PEAK - + EXIT

via NXT switch
 SPRING = X.X lbs
 NXT PRV EXIT

via NXT switch
 DEFAULT
 NXT SEL PRV EXIT

via SEL switch
 DEFAULT
 NXT RESTORE EXIT

via RESTORE switch
 DEFAULT RESTORED
 NXT RESTORE EXIT

via NXT switch
 BACKLIGHT = LOW
 NXT SEL PRV EXIT

via SEL switch
 BACKLIGHT = LOW
 NEXT - + EXIT

via + switch
 BACKLIGHT = HIGH
 NEXT - + EXIT

via NXT switch
 # OF STAGES = X
 NXT SEL PRV EXIT

via SEL switch
 # OF STAGES = X
 NEXT - + EXIT

via NXT switch
 RESET STAGES = N
 NXT SEL PRV EXIT

via SEL switch
 RESET STAGES = N
 NEXT - + EXIT

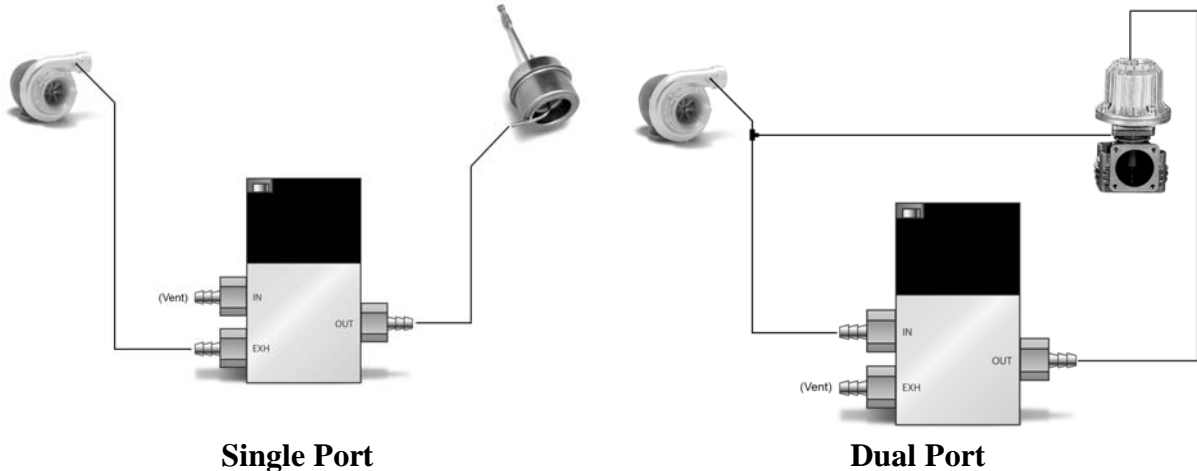
via + switch
 RESET STAGES = Y
 NEXT - + EXIT

via EXIT switch
 X.X PSI(1) 10.0
 RST REC MEN

via external switch
 X.X PSI(2) 17.0
 RST REC MEN



PLUMBING THE SOLENOID



Single Port

Dual Port



LEARNING THE SPRING PRESSURE

The PBC-1's unique approach to boost control allows the unit to learn the spring pressure of your wastegate, whether it be an actuator valve or an aftermarket dual port type wastegate. It then baselines a calculation on all of your duty cycles according to your targeted boost pressure. 0.0 PSI is the default spring pressure value if not learned. This is achieved by:

- Installing boost controller, boost transducer, and plumbed boost control solenoid.
- Set the target boost to 0.0 by selecting MEN from the Run screen and then SEL from the PSI(1) Menu screen. Use the (-) and (+) switches to adjust the target boost to 0.0. Depress EXIT twice to revert back to the RUN screen. Proceed by making a full throttle pull in third gear. This is revealed on the Run screen top row far right.

This will give the controller a best fit duty cycle the solenoid needs to run at your targeted boost level. This also enables the user to have a faster start up time, with less tuning of the controller.

To see your recorded spring pressure, select MEN from the Run screen and hold down the NXT button until the SPRING display is revealed.



Anytime a component is changed you can go back to a target of 0.0 PSI in the main screen and re-learn your spring pressure.



TUNING HINT: If boost pressure is not reached quickly, you can adjust the RAMP feature. If target is still not reached to your liking then you can add DUTY. This adds additional duty to the calculated duty. After target is achieved you can adjust the rest of boost curve with GAIN feature.



(Picture recorded from our TBC-1)

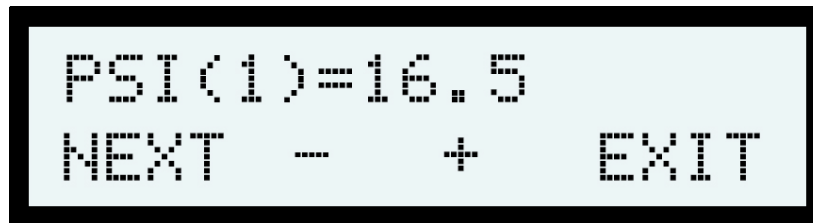
NOTE: Once spring pressure is learned correctly, all values other than PSI (Ramp, duty, gain) should start at zero and the PBC-1 will do the rest. It is because of the many complex factors within a turbo set up, we give you many ways to tune your boost curve.



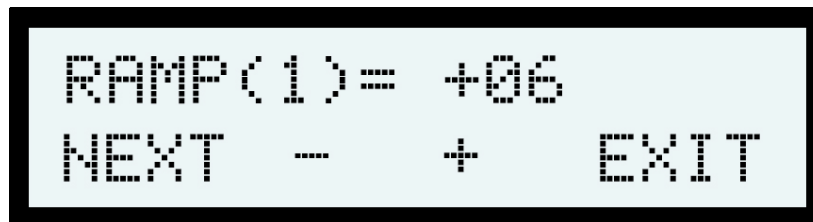
BOOST SETUP:

The RUN screen displays the measured boost, the mode of operation, and the target boost. Depressing the MEN button allows the user to select a target boost value & configure three variables related to the target boost. Depressing the NXT button will walk the user through to the parameter desired to be altered.

- The first parameter in the sequence is the boost / PSI. This parameter allows the user to specify the target boost from 0.0 to 50.0 psi, in 0.5 psi increments. Depress SEL from the menu screen to vary the target boost. The (-) and (+) allow the user to decrement or increment the target boost value. NXT will cause the display to proceed to the next parameter. EXIT will go back to the PSI menu screen.

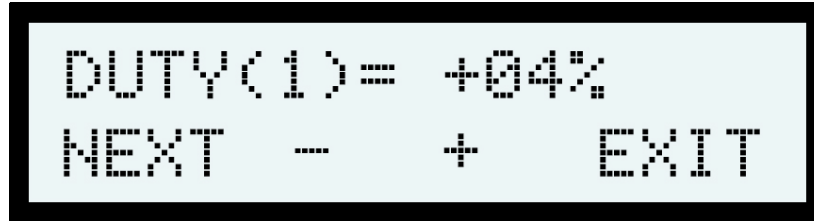


- The next parameter in the sequence is the RAMP. This parameter allows the boost to hit harder or softer as the boost spools up from 0.0 psi to the target boost. The (-) and (+) allow the user to decrement or increment the ramp value. NXT will cause the display to proceed to the next parameter. EXIT will go back to the RAMP menu screen.

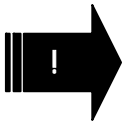
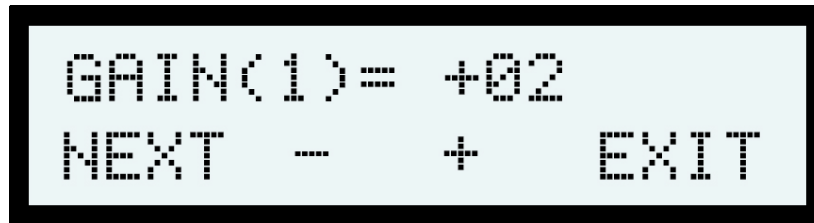


- The next parameter in the sequence is the DUTY. This parameter allows more or less solenoid duty cycle above or below the calculated duty. The (-) and (+) allow the user

to decrement or increment the duty value. NXT will cause the display to proceed to the next parameter. EXIT will go back to the DUTY menu screen.



- The last parameter in the sequence is GAIN. This feature allows fine tuning of the boost curve once target is achieved. The (-) and (+) allow the user to decrement or increment the gain value. NXT will cause the display to proceed to the next parameter. EXIT will go back to the GAIN menu screen.



TUNING HINT: It is best to leave all values other than boost at zero for initial setup, and tune from there.



MODE SELECTION OPERATION:

There are up to six boost settings available to the user, PSI (1) thru PSI (6). The user may sequence from one to the other by means of an external switch when the RUN screen is displayed. This switch, when momentarily connected to ground will cause the display to sequence through the User selected number of stages / modes of operation. The parameters of PSI, RAMP, DUTY, and GAIN can be configured for each mode which is recognizable by the value in parentheses associated with the particular parameter.

The mode of operation may be sequenced at any time while the RUN screen is displayed. This feature operates very similar to a "scramble operation".



DATA RECORDER:

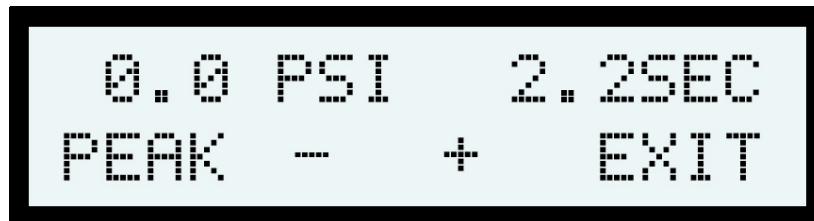
The PBC-1 contains a Data Recorder capable of recording Boost and Time for 20 seconds. The data can then be viewed in the VIEW screen. This recorder can be extremely helpful in viewing data over time for troubleshooting or tuning boost mode parameters. To initiate a record session depress the REC button while the RUN screen is displayed. An asterisk will be displayed besides the REC text on the display indicating a record session is in progress. The record session is terminated by a 20 second timeout or by depressing the REC button to toggle the record session off.



To view the recorded data, select MEN from the Run screen and hold down the NXT button until the VIEW display is revealed.

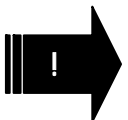


Depress the SEL button and a more detailed View screen is revealed. The PEAK button will reveal the peak boost & the respective time of the peak boost. The (-) and (+) buttons will increment or decrement the time by 0.2 seconds and update the boost that is associated with the time parameter.



RESTORE DEFAULTS:

The Restore Default Screen allows the user to erase and restore all user-specified parameters to factory default values.



TUNING HINT: Restoring Defaults will lose all previous user defined saved data in the controller.

To restore defaults, select MEN from the Run screen and hold down the NXT button until the DEFAULT display is revealed.



Depress SEL to have the ability to restore defaults by depressing the RESTORE button.



Depressing the RESTORE button(s) will restore the defaults and update the adjustable parameters to the factory settings.





BACKLIGHT:

The PBC-1 comes equipped with two backlight setting: low and high. High backlight is recommended for daytime use while low is recommended for nighttime use. To alter the backlight setting, select MEN from the Run screen and hold down the NXT button until the BACKLIGHT display is revealed.

```
BACKLIGHT = LOW
NXT SEL PRV EXIT
```

Depress SEL to have the ability to toggle the backlight settings. Use the (-) button to select the LOW backlight setting, use (+) to select the HIGH backlight setting.

```
BACKLIGHT = HIGH
NXT SEL PRV EXIT
```



OF STAGES / MODES OF BOOST:

The PBC-1 allows the User to select up to six stages / modes of boost. The Unit defaults to two stages of boost, the minimum number of stages. To alter the number of stages of boost, select MEN from the Run screen and hold down the NXT button until the # OF STAGES display is revealed.



Depress SEL to have the ability to alter the number of stages of boost. Use the (-) and (+) buttons to select the number of stages of boost from two to six stages.



Refer to page 15 “MODE SELECTION OPERATION” for information on how to set the parameters for each of the stages / modes selected.



RESET STAGES / MODES OF BOOST:

The PBC-1 provides the User with the ability to have the PBC automatically reset the stage / mode to mode 1 on power up, manually reset the stage / mode to mode 1 from the RUN screen or lastly; allow the last known stage / mode to automatically be active on power up. The PBC will default to the last known active stage on power up. This default condition is NO from the RESET STAGES menu display; the PBC will not revert to stage / mode 1 on power up, but retain the last active stage / mode when powered down, for the next power up cycle.

To reset the stage to stage 1 the User can simply depress the RST button while the RUN screen is displayed. Depress the MEN button from the RUN screen & sequence through the menu items via the NXT or PRV buttons until the RESET STAGES screen appears.

```
RESET STAGES= N
NXT SEL PRV EXIT
```

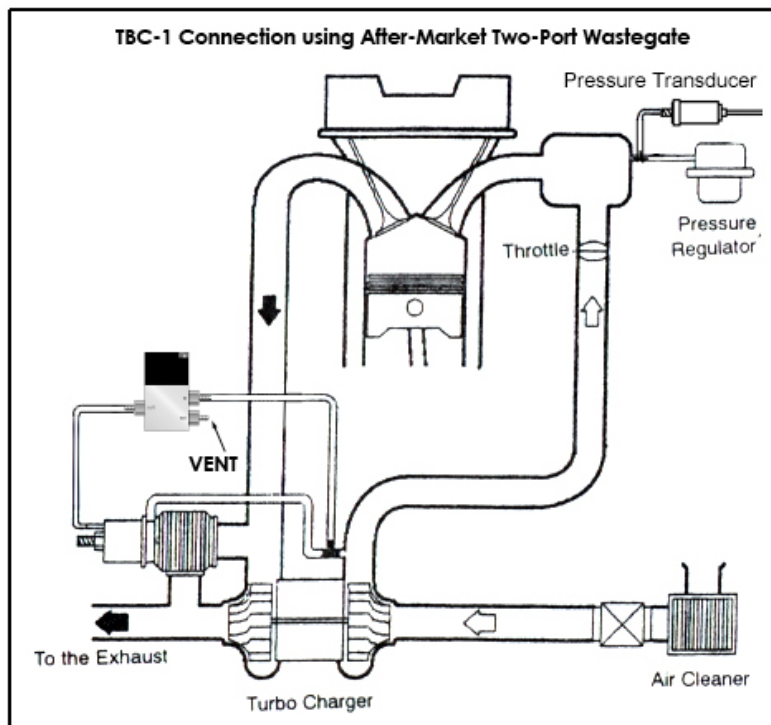
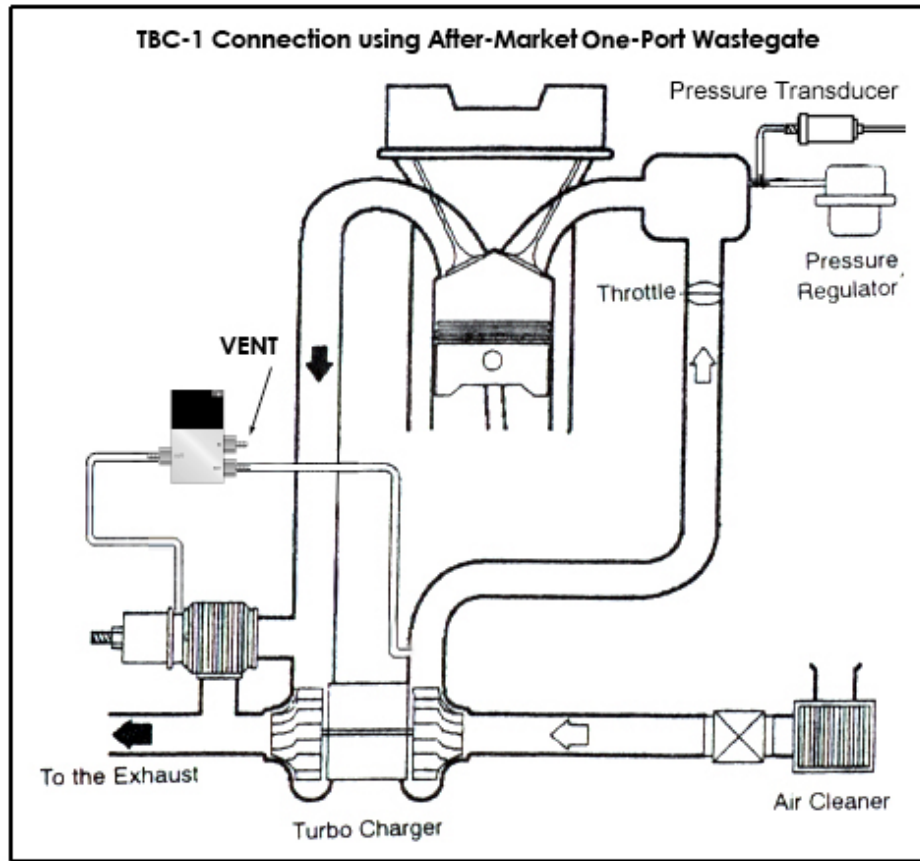
Depress SEL to have the ability to reset the stage / mode to mode 1 on power up or, allow the last known stage / mode to be active on power up.

```
RESET STAGES= N
NEXT - + EXIT
```

Depress (+) to select “Y” or yes; reset to stage / mode to mode 1 on power up. Depress (-) to select “N” or no; maintain the last known stage / mode to be active on power up.

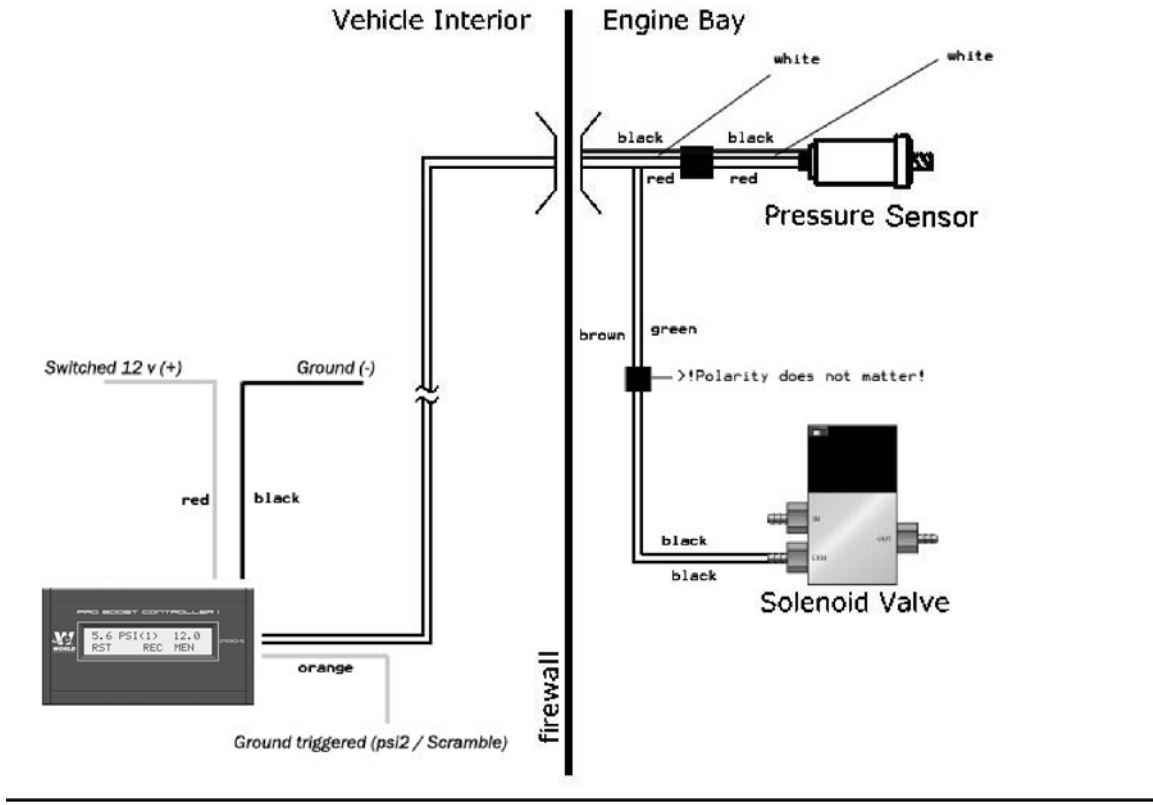
```
RESET STAGES= Y
NEXT - + EXIT
```

GENERAL VACUUM HOSE CONNECTIONS:



Qty	WORLD P/N	Description
Final Assembly		
	WE-9000.9016	
1	WE-9000.9014	PBC-1 unit
1	WE-5005.1203	Solenoid, 12VDC, .34A
1	WE-5005.5050	Pressure Transducer, 0-50psi, 5VDC supply, 0.5-4.5 output
1	WE-6009.0004	Manual
1	WE-6002.0003	Cable, External Ass'y
1	WE-9000.9015	Installation Kit
Installation kit		
	WE-9000.9015	
2	WE-6000.0021	HWM, brass "T", 0.170 ID
1	WE-6000.0008	NPT female 1/8" hose fitting
1	WE-6000.0288	solenoid mounting bracket
1	WE-6002.0004	GM weather pack connector, 3 pos, tower half
1	WE-6002.0006	GM weather pack connector, 2 pos, shroud half
3	WE-6002.0007	GM weather pack crimp terminal, female, for 20AWG, for tower
2	WE-6002.0009	GM weather pack crimp terminal, male, for 20AWG, for shroud
5	WE-6002.0010	GM weather pack cable seal
2	WE-6000.0007	HWM, male, hose barbed brass fitting
2'	WE-6000.0010	HWM, 1/8" ID vacuum hose
2.5"	WE-6000.0024	Velcro strip, 1" wide, cut to 2.5" length
1.5"	WE-6000.0025	Velcro strip, 2" wide, cut to 1.5" length

Wire Diagram



Molex Pin #	Net name	Wire source	Destination
8	Battery	Discrete red wire	stripped
7	Battery Ground	Discrete black wire	stripped
6	Scramble	Discrete orange wire	stripped
5	Transducer Power	Jacketed cable red wire	Delphi 3 pin shroud, pin A
4	Transducer Signal	Jacketed cable white wire	Delphi 3 pin shroud, pin B
3	Transducer Ground	Jacketed cable black wire	Delphi 3 pin shroud, pin C
2	Solenoid	Jacketed green wire	Delphi 2 pin tower, pin A
1	Solenoid	Jacketed brown wire	Delphi 2 pin tower, pin B

LIMITED WARRANTY & LIABILITY AGREEMENT

WORLD electronics warrants that all PBC-1 Boost Controllers shall be free from defects in materials and/or workmanship for one year from the date of purchase. The following requirements and exclusions apply: (1) You must be the original purchaser and must complete the warranty registration form and return the defective product within 10 days of your original purchase. Failure to do so voids all warranty, either express or implied set forth herein. (2) You must reside in the United States or Canada and use the product described in the warranty registration. (3) The product must not have been altered, disassembled, modified, or converted for any other use than intended by WORLD electronics. (4) The product, or any part thereof, is not used in accordance with the operating parameters specified by WORLD electronics. (5) The product or any part thereof is damaged or rendered unserviceable due to negligence, vandalism, theft, fire, debris, flood, Act of God, or other peril, malfunction of equipment, or by any cause within the Customer's control. (6) The serial number must not have been altered or removed. The extent of WORLD electronics liability under this warranty shall be limited to the prompt correction and replacement, at WORLD electronics option and at no cost to the customer other than return shipment, of any defective part of the product determined to be necessary by WORLD electronics. This only applies if written notice of the claimed defect was received by WORLD electronics prior to the expiration of the warranty period. All warranties of merchantability and fitness for a particular purpose are expressly excluded. The duration of any and all implied warranties is limited to the duration of this express warranty. All incidental and consequential damages including but not limited to loss profits even if it has been advised of the possibility of such damages are hereby excluded. Regardless of the form of the claim, WORLD electronics liability for any damages to the customer for such product is limited to the guidelines herein. This stated, expressed warranty is in lieu of all liabilities or obligations of WORLD electronics for damages arising out of or in connection with delivery, use or performance of the product. This warranty cannot be amended or changed by any WORLD electronics representative, employee, or agent and any promise inconsistent with this warranty are void and unenforceable against WORLD electronics. Some states do not allow limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights that vary from state to state. Your sole remedy for the above warranties is the repair or replacement of the defective product only, at WORLD electronics sole discretion.

Return Policy:

Note: No returns accepted without pre-approved RMA (return material authorization) number clearly marked on the outside of the box. No returns accepted after one year from the date of purchase. Returns made without prior authorization will be refused. We recommend using UPS for shipping. In-bound freight is always customer's responsibility.

Performance Consumer's Bill of Rights:

Legally, a vehicle manufacturer cannot void the warranty on a vehicle due to an aftermarket part unless they can prove that the aftermarket part caused or contributed to the failure of the vehicle (per the Magnuson Moss Warranty Act 15 U.S.C. 2302(C)). For best results, consider working with performance oriented dealerships with a proven history of working with customers.